DIGITAL DIGEST

Vol. 7 No. 2 *Devoted to Amateur Radio Digital Communications & Technology* March/April, 1994

In This Issue . . .

The DIGIPEATER
features news and information from a realm of sources on ham radio, computers, software and digital communications...

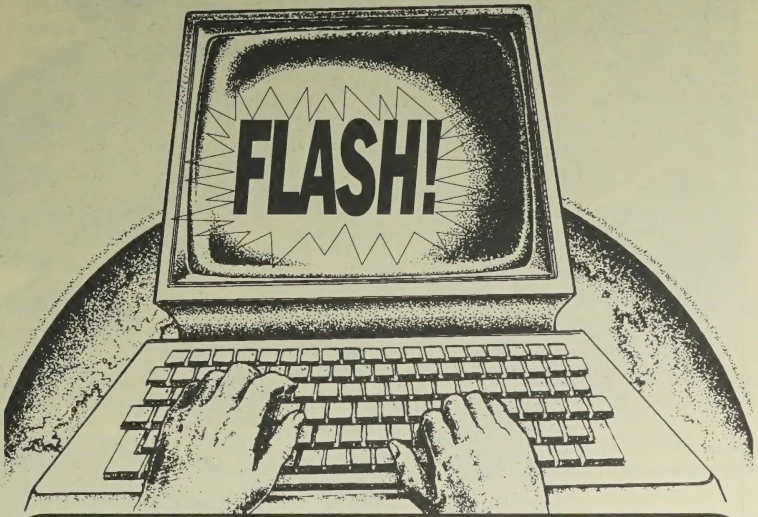
BITS & BYTES
Wayne Renardson, NZ4W
delivers some tid-bits on a variety of subjects including software, hardware, the First Amendment and Virtual Reality...

REVIEWS
Tom Torgerson, N0MOP
looks at the JPS NIR-10 Digital Signal Processor...

Plus info on:

- *The Information Highway*
- *Satellite Communications*
- *The Internet*

& more!



Negotiations with the RTTY Digital Journal (RDJ) have lead to an exciting merger of the two publications. Here's what it all means to you... *both current and past subscribers of DD.*

Current subscribers of Digital Digest will now begin to receive the RTTY Digital Journal to fulfill the balance of your *DD* subscription. Since the RTTY Digital Journal is published 11 times a year (instead of *DD*'s six) you may actually end up with additional issues added to your current subscription. As a bonus, the publisher of the RTTY Digital Journal has agreed to allow current *DD* subscribers to renew

(cont'd on page 3)

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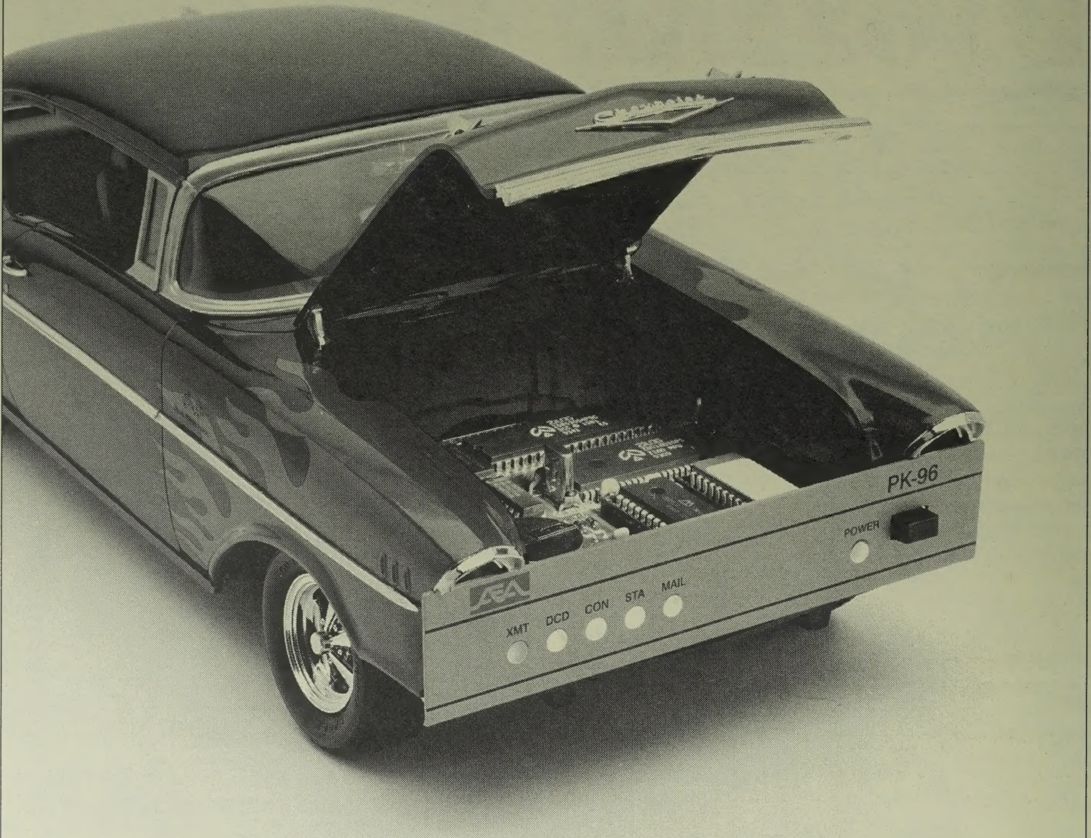

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The DIGIPEATER

News & Information
communicated from various sources

☛ **DARA (Dayton Amateur Radio Association)** is the recipient of some unexpected free publicity! The April Radio Shack (full color) advertising flyer which mails to about 10.5 million homes will carry the Dayton HamVention logo and the dates of the ham gathering. Just about every ham operator in the U.S. gets the Radio Shack circular in the mail. HamVention, which runs from April 29 to May 1, is America's largest ham gathering with some 35,000 amateur radio operators attending every year.

And while on the subject of the Dayton HamVention, ICOM introduced their new ICOM-820 Satellite Base Station Transceiver. The transceiver is 9600 baud compatible out of the box, is in the 50 watt output class and covers 146/435 MHz.

☛ **Cable operators** are understandably concerned about the coming billion dollar DBS roll-out! If everything goes as planned, DirecTV and its partner, United States Satellite Broadcasting, Inc. (USSB) will be beaming full power digital DBS (Direct Broadcast Satellite) service to the public within a month! GM and Hughes Electronics are spending some $750 million to offer satellite-to-home television via their DBS-1 satellite. And a DBS-2 bird will follow later this year.

Programming will be uplinked by 54 high-power satellite uplink transmitters from DirecTVs $100 million all-digital Castle Rock (Colorado) Broadcast Center. Supposedly the 24-hour service will eventually have 150-channel capability and some 30 pay-per-view sports channels. DirecTV debuts on May 1 st with 75 channels broadcast from one jointly-owned satellite. USSB will be uplinking from their new $10 million broadcast center in Oakdale, MN.

But satellite television won't come cheap! Viewers wanting the new service will have to shell out $700 for the 18-inch dish and receiving equipment ,,,plus an installation charge ...plus a monthly subscription fee which starts at $21.95 monthly. The equipment can be purchased in installments of about $30 a month, however. RCA has an exclusive deal with DirecTV to manufacture the first one million receiving units. (Actually the Digital Satellite System home receiving unit is being made by Thomson Consumer Electronics under the RCA label.) Thomson will spend nearly $100 million on an advertising campaign; Hughes another $50 million. The satellite service will be marketed by such well known consumer retail outlets as Sears, Wards, Best Buy and Circuit City DirecTV says their signal quality will be better than cable since it is digital and they will offer double or triple the amount of programming options.

DirecTV's break-even point is 3 million subscribers - or about 5% of the current cable market. We understand that the DBS service will be first test marketed in 5 cities (Tulsa OK, Albuquerque NM, Little Rock AR, Jackson, MS and Shreveport, LA) before the national roll-out begins later this fall.

And another mew DBS service (EchoStar) is on the horizon for 1995.

☛ **President Clinton** has indicated his intention to appoint two women lawyers to fill the two FCC Commissioner vacancies. Rochelle Chong, at 34, will be one of the youngest FCC Commissioners and the first of Asian American heritage. She is currently a San Francisco lawyer specializing in communications (cellular phone) law. She also has a degree in political science and journalism. Chong, a Republican. will fill the unexpired portion of Commissioner Sherrie P. Marshall's term which ends in 1997. She was not Clinton's first choice, but one acceptable to Senate Minority Leader Robert Dole (R.-Kan.) Dole supposedly held up the confirmation of FCC Chairman Reed Hundt until the White House came up with a Republican nominee to his liking.

We also understand that Susan Ness, 45 will fill the Democratic seat made vacant when Ervin Duggan resigned to head the Public Broadcasting System. She has personal ties to Clinton and was an active Clinton-Gore supporter and campaign fund raiser. Ness has a law degree from Boston College and a MBA from the University of Pennsylvania's prestigious Wharton School of Business. She is a member of the Federal Communications Bar Association.

☛ **We understand** that the FCC has taken final action on establishing a new compliance policy for amateur stations participating in automated packet radio message forwarding networks.

You will remember the 1991 turmoil that resulted when several amateurs were cited by the FCC for unknowingly . and automatically retransmitting an anti-! Persian Gulf war packet message that had "900" phone number business overtones. It wound its way through several stations before being killed.

(cont'd on back page)

(cont'd from front page)

your subscription for one full additional year at the Digital Digest rate of $16.00 U.S. ($24.00 Other). This means a savings of at least $4.00 off the normal RDJ rates.

Past *DD* Subscribers — you're not left out either! Simply fill out and check "NEW" on the coupon inside the back page of this issue, and mail with appropriate payment, to begin your one year subscription to RDJ at special savings.

Here's more of what our merger means to all Digital Digest readers. Along with your subscription to RDJ, you will also gain automatic membership to the **A**merican **D**igital **R**adio **S**ociety (**ADRS**), a not-for-profit organization dedicated to voicing, and promoting, the interests of all those amateur operators who enjoy the digital modes. As amateur digital communications continue to grow, it has become increasingly apparent that we have a unified voice in addressing those issues specific to our digital operations. The ADRS will provide that voice, and your support, through membership, will make it all the more viable. As mentioned earlier, with membership, you will receive an annual subscription to the RTTY Digital Journal, now published 11 times per year.

Every issue of the RDJ contains 32 pages chock full of digital operating and technical info, including an expanded *Digital Digest* section containing news, reviews and current happenings in the world of digital communications. I'll be there as column editor.

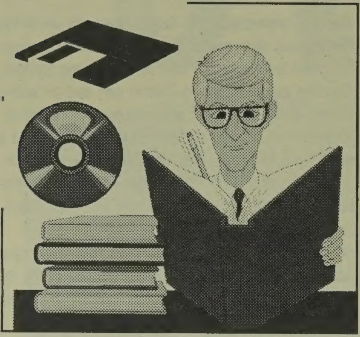
Join the ADRS now, and you'll receive a special
"Digital Modes" issue of the Journal, due to be published in August.

In closing, we want to thank all of you, advertisers and subscribers alike, who have supported Digital Digest over the past 6+ years. It has been a wonderful experience as publisher of the Digest, and it is a great feeling to say that this is not the end, but the beginning! There are exciting new things happening in the world of amateur digital communications and for the future of RDJ. In the course of our new joint venture, we hope you will all choose to take part. Now, instead of two good publications, the ADRS Board of Directors, the RDJ publisher, and I, will work toward delivering to you one great source of information on your favorite modes of digital communications and related technologies!

73 & CUL... Tom, WA8DXD

by Wayne Renardson, NZ4W
1113 Woodvale Dr. • Nashville, TN 37204

Tid-Bits on Software, Hardware, The First Amendment and "Other Thoughts"



☛ **Matthew Giles of SemWare** called to say he read the review of QEdit in Digital Digest, Vol 6, No. 5, Sept/Oct 1993 and wanted us to know that they will offer a 25 percent discount off their list price to any amateur radio operator who registers QEdit, which is now upgraded to version 3.0. They added a spell checker, in addition to other goodies, and a short review will be in order when it arrives. Send a copy of your license with your order or give them your call sign when you telephone. Semware is located at 4343 Shallowford Road, Suite C3A, Marietta, GA 30062-5022 Voice 404-641-9002; FAX 404-640-6213; BBS 404-641-8968 (24 hr/day); On CIS type Go Semware or 75300,2710.

☛ **The Fall Computer Security and Virus Catalogue** takes a cynical attitude toward the virus critters by suggesting that some of them were launched by companies who make anti-virus software. Linking censorship with viruses, they advance their ideas in the form of a syllogism: A government that seeks to consolidate all power will capture technology, especially digital technology. The US government has indeed asserted its right to license the export of cryptography software and is trying to make it illegal to possess certain technology, that of viruses, which are technology, in spite of the fact they are not benevolent. There is a concerted effort on the part of the government to restrict certain technologies, hence restricting public access to information. Ergo, censorship.

They carry books that specialize in virus knowledge, maintaining that while the anti-virus software industry may be part of the solution, there is no substitute for knowledge of how viruses are actually concocted. They claim their books teach you how to construct a virus, and they include sixty examples of source code for you to compile and play with, rather like a pet virus. Their rationale is to give you practical experience so you can prepare your defense against the vermin with solid information. Not for the technically fainthearted, you can order their catalogue from American Eagle Publications, Inc., P.O. Box 41401, Tucson, AZ 85717 (602) 888-4957.

☛ **For CD-ROM phreaks, S&S publishing offers their Hacker Chronicles,** a software package that contains stories of how hackers do it (you have been dying to know, right?), actual break-ins, arrests, and prosecutions. The publishers claims the articles were written by the people who committed the acts. They touch on phone phreaking, which include amateurs and hobbyists who are fascinated by telephone technology and who often break the law by bypassing billing. The authors also include articles about cyberpunks, a term they use to define people who are interested in breaking into any computer system they can find. For the video fans, they offer material on satellite descrambling systems and information about the technical working of ARTs, voice mail, cellular phones, signal interception (hmmmm! wonder if they can help me snag that HX4 that came on CW last night?), computer ethics, underground BBSs, and cable TV piracy. Since I do not have a CD-ROM player, there is no way to attest to the veracity or worth of the information, but for those technically minded types who don't mind taking a walk on the fringes of computing, the CD requires a PC with EGA/VGA, 525K free, a CD-Rom drive, and an optional sound blaster. All available from S&S Publishing, 15419 127th Street, Lemont, IL 60439. The CD-ROM is also distributed by P-80 Systems, 3310 5th Ave., Charleston, WV 25312 (304) 744-7322. Price unavailable.

☛ **From Walnut Creek comes an updated QRZ!** Ham Radio CD-ROM for amateur radio operators and shortwave enthusiasts. Designed to run under MS-DOS or Windows 3.1, the disc contains over 600,000 call signs from both Canada and the USA. The literature claims any call can be retrieved in under two seconds. The interface is documented so it can be easily interfaced to a custom application, in addition to the support from several logging programs. It also contains the complete text to FCC approved license examinations, questions and answers, and a current copy of Part 92 regulations. Packet phreaks will notice several popular TCP/IP and packet BBS packages are included in their entirety, with source code for most of them. They also toss in many shareware utilities, satellite tracking software, and mapping programs. The CD is updated quarterly and is available from Edward McGrath, Walnut Creek CD-ROM, 1547 Palos Verdes Mall, Suite 260, Walnut Creek, CA 94596 toll-free 1-800-786-9907 or via InterNet info@cdrom.com. The price is $29.95 for a single CD with quarterly updates available for $19.95.

☛ **First Amendment alert! The Bill of Rights, part of the U.S. Constitution,** deals with the stress that exists between the rights of the citizens and a powerful, centralized government. Americans have an historical fear of a government often too willing to deprive individuals of their right to guarantees under the Bill. But coupled with these rights go responsibilities. The right each person has to swing their arm is a given. But that right ends where the tip of my nose begins!

The Amateur Radio Service has for years been plagued with the issue of free speech. Operators have contacted the FCC thousands of times to report someone using language they found offensive. Suppose I compose a packet message to be sent from Nashville to San Francisco. I use the dreaded word f**k in the body of the text, which is otherwise free of scatology. By what authority does any sysop have the right to (1) remove the offending word or (2) delete the entire message. Suppose the message enters the system unmolested or uncensored. Let us also assume that as adults we do not believe that reading the word as it passes over our monitors will result in harm. But ah, you might have your six-year-old daughter or son sitting in your lap as you read the mail. And as a parent, you have the right—and some would suggest the obligation—to subject your children only to material you find acceptable. I will defend Althea Flynn's right to publish Hustler magazine. But I will also assume the responsibility of keeping it out of the hands or sight of my hypothetical six-year-old child. I will defend your right to log onto an adult BBS, and the sysops' right to run the board, if you are both of age, but I will expect the sysop to ensure that my talented six-year-old cannot log on and download GIF files of material that should only be viewed by consenting adults. I also have a responsibility to see that my hacker child does not become involved in viewing files I consider unsuitable.

There is a delicate balance between the tensions of individual freedom and governmental encroachment, particularly when enforcing laws the government has mandated. The desire to impose laws (i.e., it is illegal in Tennessee to sell pornography to minors) to protect our most susceptible citizens from the presumed influence of certain information (pornography is information, although I am not certain how to define pornography) is very strong among many citizens.

Digital communications present special problems that are only now beginning to be addressed by a limited public, since most people have yet to purchase their first personal computer, while millions use them exclusively for keeping recipes, playing games, or balancing a checkbook. Those who use any of the massive commercial BBSs such as CompuServe or AOL know the problems that have arisen in the past, and as the digital communications revolution expands in both breadth and depth, the issues of personal or intellectual freedom to possess, convey, and view certain types of information are going to become more complex. Is it time to examine a new bill of rights for digital communications?

A Bill of Rights and Responsibilities for Electronic Users grew out of the National Research and Educational Network (NREN) group study on issues of intellectual property and education with the idea of a free society and the question of who should control knowledge. Their work was presented to the U.S. Congress Office of Technology Assessment under the title A Bill of Rights for Electronic Citizens. Its main premise is that the things society values can be facilitated through technology, and laws should only be written to help citizens achieve the things they value.

The Bill is considered a work in progress, and comments are solicited. Since most of our readers are users of digital communications technology, the draft bill is presented for your consideration. While the focus is on education, it has significance outside the academic community, even for users of Packet, RTTY, AMTOR, PacTor, CLOVER, CW, or any other digital codes. Some readers may even have children in school, and we all have a vested interest in educating our citizens. A few words have been edited out for brevity.

<<< PREAMBLE >>>

In order to protect the rights and recognize the responsibilities of individuals and institutions, we propose this Bill of Rights and Responsibilities for Electronic Community of Learners. These principles are based on a recognition that the electronic community is a complex subsystem of the educational community founded on the values espoused by that community. As new technology modifies the system and further empowers individuals, new values and responsibilities will change the culture. As technology assumes an integral role in education and lifelong learning, technological empowerment of individuals and organizations becomes a requirement and right for [people], bringing with it new levels of responsibility that individuals and institutions have to themselves and to other members of the community.

<<< ARTICLE I: >>>
INDIVIDUAL RIGHTS

The original Bill of Rights explicitly recognized that all individuals have certain fundamental rights as members of the national community. In the same way, the citizens of the electronic community have fundamental rights that empower them.

Section 1.

A citizen's access to computing and information resources shall not be denied or removed without just cause.

Section 2.

The right to access includes the right to appropriate training and tools required to effect access.

Section 3.

All citizens shall have the right to be informed about personal information that is being used and has been collected about them, and have the right to review and correct that information. Personal information about a citizen shall not be used for other than the expressed purpose of its collection without the explicit permission of that citizen.

Section 4.

The constitutional concept of freedom of speech applies to citizens and electronic communities.

Section 5.

All citizens of the electronic community have ownership rights over their own intellectual works.

<<< ARTICLE II: >>>
INDIVIDUAL RESPONSIBILITIES

Just as certain rights are given to each citizen of the electronic community, each citizen is held accountable for his or her actions. The interplay of rights and responsibilities within each individual and within the community engenders the trust and intellectual freedom that form the heart of our society. This trust and freedom are grounded on each person's developing skills necessary to be an active and contributing citizen of the electronic community. These skills include an awareness and knowledge about information technology and the uses of information and an understanding of the roles in the electronic community.

Section 1.

It shall be each citizen's personal responsibility to actively pursue needed resources: to recognize when information is needed, and to be able to find, evaluate, and effectively use information.

Section 2.

It shall be each citizen's personal responsibility to recognize (attribute) and honor the intellectual property of others.

Section 3.

Since the electronic community is based upon the integrity and authenticity of information, it shall be each citizen's personal responsibility to be aware of the potential for and possible effects of manipulating electronic information: to understand the fungible [their word] nature of electronic information; and to verify the integrity and authenticity, and assure the security of information he or she compiles or uses.

Section 4.

Each citizen, as a member of the electronic community, is responsible to all other citizens in that community: to respect and value the rights of privacy for all; to recognize and respect the diversity of the population and opinion in the community; to behave ethically; and to comply with legal restrictions regarding the use of information resources.

Section 5.

Each citizen, as a member of the electronic community, is responsibility to the community as a whole to understand what information technology resources are available, to recognize that members of the community share them, and to refrain from acts that waste resources and prevent others from using them.

Articles III and IV pertain to educational institutions so will be omitted. Further details may be obtained from EDUCOM Review, Vol. 28, No. 3, May/June 1993, pp. 24-25. Their E-Mail address is editors @ educom.edu or via John Gehl, Editor, Inter-University Communications Council, 1112 16th St. N.W., Suite 600, Washington, DC 20036 (202) 872-4200, FAX (202) 872-4318.

(Cont'd on page 6)

(Cont'd from page 5)

☛ **Power PC:** The March 1994 announcement of the Macintosh's new computer, based on RISC technology, makes the RISC processor a viable option. For ambitious amateurs who might want to design a digital communications system around a powerhouse chip comes the Motorola 601 PowerPC. The 601 microprocessor CPU is the first in a series of reduced instruction set chips (RISC) chips from Motorola that are appearing under the PowerPC rubric. The processor has certain functional characteristics that make the chip a contender to be the "next big thing."

RISC, pronounced "risk", is a type of microprocessor design that focuses on rapid and efficient processing of a relatively small set of frequently used instructions. RISC design assumes that most of the instructions, coding and decoding, and routines processed by the computer are simple to execute and that they are frequently used. As a result, the number of instructions is limited but each is optimized to be carried out within a single clock cycle. In order to handle complex instructions, the RISC chip must break the routines into smaller chunks, unlike computers (Intel 386 etc.) that are designed to process complex instructions. The 601 will execute up to three instructions per clock cycles.

Based on a design by IBM, Motorola claims the 601 handles the 32-bit portion of the PowerPC architecture, including, 8, 16, and 32 bit integer data, and 32 and 64 bit floating point data types. The chip also provides the means to handle 64-bit integer data types, 64-bit addressing, and other features required of 64-bit processing. In addition, the chip will execute instructions regardless of their order while making the flow appear sequential. It integrates three execution units—-an integer unit, and branch processing unit, and a floating-point unit. All three units can be executed in parallel, adding additional power to the chip.

The 610 chip contains an on-board 32-Kbyte cache, uses a 64-bit data bus, and a 32-bit address bus. It uses a 3.6 volt CMOS that is fully compatible with TTL devices. The chip runs at 50, 66, or 80 MHz and is less than 11 X 11 mm in size. It's memory management unit supports up to 4 Petabytes (2 to 52nd power) of virtual memory and 4 Gigabytes (2 to 32nd power) of physical memory.

Since the point of a RISC chip is to execute simple instructions quickly, the design is less complex, it can be debugged easily, so they are cheaper to produce, making them readily available to the amateur. In addition, competing with the 601 is the Sun Microsystem RISC chip called SPARC, while Intel has the i860.

For portable applications, Motorola also offers a PowerPC 603 chip that uses open architecture to run on any available operating system, from Macintosh, OS/2, UNIX, Solaris, pen-based systems to the new object-oriented systems such as Taligent. It will even, via emulation, run MS-DOS. At the Dayton hamfest several years ago, Mel Whitten, K0PFX, said to me, "Look Wayne, we live in an MS-DOS world." No longer.

The 603 adheres to the 601's architecture so it also executes up to three instructions per clock cycle while running at speeds up to 80 MHz. It requires only 3.3 volts, maximizing battery life. It further reduces power consumption by offering three power-management modes they refer to as Doze, Nap, and Sleep, with automatic adjustment dependant on use.

There are numerous other features of this powerful processor, and additional information can be obtained from Motorola Technical Literature, P.O. Box 20924, Phoenix, AZ 85036.

☛ **Other Thoughts...** Remember the books that offered suggestions about how you could travel Europe on five dollars a day? Reading the recent Op-Ed piece in QST by Jim Chatham, W4TNF, reminded me that there is always another point of view worth considering, even if it happens to be from a friend.

About 1984 I was in chatting on 40 meter CW with Bill, W4OQ (SK). After signing off, I was called by W4TNF, who had been reading the mail. Jim introduced himself and we exchanged the usual pleasantries. Since he heard me tell my previous contact I was going to be in Port Gibson, MS for a few weeks, he asked if I would be willing to take photographs for him. It seems Jim had served as a Presbyterian minister in Fayette, MS, during the heyday of the civil rights struggles in the sixties. Fayette was the home of Medgar Evers, the slain civil-rights leader, and Jim wanted me to take some photos of some old, familiar places. Since Port Gibson is only eighteen miles from Fayette, I told him I would be happy to take some shots. After a short discussion, it became evident that Jim was a serious person with a keen sense of humor possessing a mind willing to listen to many different, often opposing ideas—-in short, a fellow with an appreciation for paradox. We had many, usually weekly but sometimes daily CW contacts, a difficult task for a man with a 24-hour a day job (ministers are on 24-hour call) and several children to raise, all on an honest clergyman's wages. Jim operated smooth CW at about 45 wpm and managed to string his words together coherently, making it a pleasure to copy him. We became friends, discussing and often solving the problems of the world right there on 40 meters, somewhere in the middle of the philosophy subband, circa 7.033 mHz. Jim's duties with his ministry would sometimes bring him into Nashville from his Louisville, KY home. He would stop by my house, his six-foot seven-inch frame barely passing under my door stoop, arriving with warm donuts to go with our hot coffee. He and my wife would discuss art, literature, and religion, not necessarily in that order, while we enjoyed the sweets. I was not surprised to read Jim's thoughtful piece in QST, since it reflects the spirit of the man as I know him.

In case you missed reading it, I offer a recap of Jim's ideas. His basic premise is that look, it is possible, and even beneficial, to spend only one hundred dollars a year on amateur radio and come out a bigger winner than if you had spent considerably more. His ideas require a change in thinking, but if you think cheap instead of how much you purchase, the joy to be derived from something other than bells and whistles will be great. But as Jim warns, "Life in America doesn't prepare us for this approach; it may even seem downright subversive." He says to first think skill. I recall receiving a QSL card from a QRP CW operator in Colorado I had worked on 80 meters. The card was emblazoned on the front with, "Power is no substitute for skill," and it is this approach Jim prefers. By developing skills instead of buying expensive toys, the long-term gain can be impressive. He then recommends building a transmitter by finding a schematic you can grow to understand, then putting the equipment on the air to taste the rarified atmosphere shared by those who know they are communicating with something they built rather than bought. And in lieu of excuses, he recommends concentrating on what can be done rather than something that can't, and exhilarating in the possible.

Reminiscent of President John F. Kennedy, Jim thinks the question is not "What can I buy next" but should be "What can I do with what I already have?" He suggests forming a relationship with your equipment, recalling what it has done for you in the past, and setting goals for what it can do for you in the future. Possibly this is where the skill part comes into play, since it requires some proficiency to maintain an older piece of hardware. And you become more intimate with your equipment once you have dug around in its underbelly. Of course, if you had built your equipment...

Jim shares the truly meaningful events during his 42 years of operating amateur radio, beginning with working 133 countries on a home-brew 40 watt crystal-controlled radio using a dipole antenna. The thrill for Jim was not so much in breaking the pileups with low power as it was learning patience and getting over the all-too-human demand for first-time results, knowing that there is a tomorrow that will bring another opportunity. Probably more important is Jim's 13-year weekly sked with Jack, W1HDC, who lives in rural Maine. Having heard them a number of times, the diversity of their conversations range from politics to sex, from soup to nuts, and anything in between. Jim worked Jack on CW for six years prior to a eyeball meeting, and outside his family, Jim claims he knows no one any better. Possibly it is because Jim is a southerner while Jack is from the north, or that Jack prefers Chicago jazz to Jim's bluegrass music, or because Jack is agnostic and Jim is an ordained minister, one a city boy while the other is a farmer, that it works so well.

As his final joy, Jim cites other far flung friends he has made over the years. And maintaining friendships is not an expensive proposition. Finally, he suggests the main benefit is avoiding the mindset that predicates happiness with how much money you spend on equipment. He relates a recent 2 meter QSO with a newly licensed operator who was unemployed and worried about how he was going to purchase additional equipment. Jim claims he was tempted to preach, but decided to let it be. And if I have failed to accurately convey his sentiments and ideas, mea culpa! ■

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More on the Internet Information Highway

Some 20 million users are now on the grand daddy of all computer networks, the Internet. The net has been doubling in size every five years. And users are being added even faster ...at about 10% a month. Another 5 million users of on-line networks also have access ...at least to the E-mail portion.

What used to be used solely for research and academic purposes now has reached the general population/residential sector. In short, the Internet is now a commercial consumer product. You can obtain a provider list and startup information by calling the InterNIC (Network Information Center) toll-free at 800444-4345. (6:00 a.m. to 6:00 p.m. EST) or FAX: 619455-4640. This same organization also registers machines and issues IP (Internet protocol) addresses to net members. Call them and at least listen to their recorded info.

Initially, the U.S. government funded the network through the National Science Foundation and the Department of Defense. The National Science Board (NSB) makes the major decisions at the NSF. NSFNet, formed a decade ago to connect nine super computer centers, is managed by a consortium of Michigan universities and indirectly, by IBM and MCI. The NSFNet "backbone" is now being privatized to commercial providers. And the NSB has approved MCI as the operator of another network which will be separate from the Internet. AT&T is developing a Directory of Directories.

Navigating the Internet

Since the Internet is gigantic and is not owned by anyone, it tends to be difficult to negotiate. In short, it is not user-friendly. The two most widely-used browser/search/interface devices are the "Gopher" (developed in 1991 at the University of Minnesota home of the Golden Gophers) and "Mosaic," a product of the National Supercomputing Center Association. The NSCA is located at the University of Illinois in Champaign. Others browsers are available ...all at no cost online. FTP (file transfer program) is a generic tool for retrieving files and Telenet, a way of logging onto someone else's computer.

Many independent software companies are now developing automated/simplified menu-driven consumer packages that include the transmission control protocol/Internet protocol (TCP/IP) and browsers such as "Mosaic". These "plug-and-play" programs offer good documentation as well as support. (Be on the lookout for the "Internet-in-a-Box" ...about $100.)

TCP/IP is needed to connect dissimilar PCs to the Internet. It was invented by MCI's Vinton Cerf, cofounder and president of the Internet Society. The original idea of the Internet was simply a mechanism to lash different computers to each other. Theoretically TCP/IP was to be a stop-gap standard but many insiders now feel an upgraded version could well become the standard of the Information highway. The Internet consists of more than 26,000 different networks. TCP/IP can handle more than a million.

Common carriers are noting the public's appetite for computerized information and are jumping on the Internet bandwagon. Phone companies (such as AT&T, MCI, Sprint) are beginning to offer Internet through national Internet access providers. Not to be outdone, cable companies are testing cable modems that link viewers to the Internet over their coaxial networks. An Internet online magazine ("Global Network Navigator") focuses on features.

E-Mail addresses

If you have an on-line service (such as Prodigy, CompuServe, Delphi, MCI-Mail, America Online, GEnie ...and others) you already can send and receive electronic mail over the Internet. E-mail addressing is very simple. You simply indicate the user name/number at (@) the online service and then add three suffix letters. For E-mail, this is usually "com" (which stands for commercial organization.) Other suffixes include: edu (Educational), gov (Government), mil (Military), org (non-profit organization). Note lower case letters.

Sending E-mail to an MCI-Mail user: The Internet address is: user ID name or number @mcimail.com. Thus my Internet address is fmaia@mcimail.com (or 3511297@mcimail.com). There are no spaces and a period before the com. With Compuserve it is a little different. Their IDs are two numbers separated by a comma. Since Internet can't recognize commas, change the comma to a period and add @compuserve.com. For example: Want to send E-mail to talk show host Rush Limbaugh? His Compuserve ID is 70277,2502. From any online service his electron-

(cont'd on page 8)

(cont'd from page 7)

ic mail address is 70277.2502@compuserve.com (Period between the two ID numbers and between the online service and the com) Here are some others: Prodigy (IBM/Sears): ID number @prodigy.com America Online: User name plus @aol.com AT&T Mail: Username@attmail.com BIX (run by Byte magazine): User ID@bix.com Delphi: Username@delphi.com GEnie (operated by General Electric Information Service): UserID@genie.geis.com (Note the two periods.) SprintMail: Alias@sprint.com

You get the idea.

UNTANGLING THE WEB -

Getting on the Internet, Hassle-free

In our last installment we covered the evolution of the Internet. What started out some 25 years ago as an experimental military fail-proof data network is now in the process of being privatized to the commercial sector. Along the way, the Internet, funded by the National Science Foundation, became the information highway of the academic and research community. Today, firms everywhere are jumping on the Internet information bandwagon.

Soon, the Internet will become a consumer communications product. The reality is, however, the network was initially designed for the computer professional ...not the mass market. For the beginner, the four biggest hurdles in getting connected to the Internet are: (1) establishing an account, (2) obtaining the needed software, (3) the difficulty of software installation and then (4) negotiating through the network.

Actually most of the needed "software" and "tools" are online freeware or shareware. And several commercial packages which accomplish specific functions are available. So far, however, the total Internet solution for the novice is not available.

Short of a dedicated connection, the best way to directly access Internet using a PC over the phone lines is through SLIP (Serial Line Internet Protocol) or PPP (Point-to-Point Protocol) software. Which one you use depends on the service provider. Both protocols make you a full-fledged player on the Internet. There is a big difference between direct (complete) and remote third*party or shell network access.

The Point-to-Point Protocol is the newest and probably the most desirable. A disadvantage is that you need a high-speed modem; 1,200 or 2,400 bps simply isn't fast enough. PPP operates over the phone lines at 9,600 bps and faster. (14,400 bps is even better.) The faster speed is important for transferring or copying files and a side benefit is the reduction in online time.

What is "Internet In A Box?'

As mentioned in our last issue, help for the Internet newcomer appears to be on the way! Internet In A Box is a new software product that should provide a simple solution to Internet access. It answers the question, What do I need? How do I get on? ...and once on, What do I do with it? We took the liberty of, contacting the publisher (O'Rielly & Assoc.) to learn more. Here is what we found out.

In a nutshell, The Box is basically a kit of needed Internet materials most of which are already available piecemeal. You could compare Internet In A Box to a assembled computer, rather than to its hardware and software components. While a professional can build a computer from its "ingredients," most neophytes do not have the expertise - or know what is needed..

A joint venture of O'Reilly and Associates, Inc., (Sebastopol, CA) and SPRY, Inc., (a Seattle-based internetworking software firm) Internet In A Box indeed has the potential to bring the Internet to the masses.

Reportedly, it offers simple installation and connectivity, contains easy-to-use navigational tools and features a well-conceived system for organizing the best resources available on the Internet.

It will be the first shrink-wrapped "plug-and-play" consumer package to provide the total solution to direct Internet access. You can bet that other TCP/IP DOS and Windows Internet "solutions" will follow. The advance publicity says "Internet In A Box provides instant connectivity, a multimedia Windows interface, a full suite of applications, and the first interactive guide to the Internet."

Just what's in "The Box?."

- Optional automatic connection to the Internet via a service provider (service fees are deter mined by the provider)
- Global Network Navigator (GNN), the first interactive guide to the vast information resources of the Internet, which uses AIR Mosaic, an advanced, multimedia information browser
- AIR Series Internet Applications for Windows, including electronic mail, USENET news reader, drag-and-drop FTP (file transfer), telnet (a log-on utility), and Gopher (a retrieval tool.) All are SPRY's streamlined interactive versions of existing Internet utilities.
- Two books that clearly describe how to use these resources, including a guide to getting started and a special edition of Ed Krol's best-selling Whole Internet User's Guide and Catalog.

What kind of system do I need?.

To use Internet In A Box, you will need the following minimum requirements: . MS-DOS 3.0 or later . Windows 3.1 or later . 2 MB of RAM . A mouse . 9600 baud modem ...or faster Everything else is in 'The Box.'

Access to the Internet

Sprint Communications, Inc. launched Sprintlink in 1992 specifically to automatically access the Internet via a "1-800" phone number. While Internet In A Box features the SprintLink TCP/IP-based service, you do not have to use it if you already have a PPP Internet account. You can use the stand-alone version of Internet In A Box with your existing access provider. If you choose instant access through SprintLink, you'll pay a monthly fee of $9.95 plus an hourly connect fee of $9.95. There is no setup or installation fee.

How much does Internet In A Box cost?.

List price is $149, the street price will probably be in the $100 range when it becomes available later on this summer. A Mac version will follow.

— by Fred Maia, W5YI Report 4/15/94

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HAMCALL NEWS RELEASE

Buckmaster's HamCall CD-ROM April 1994 Edition

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The new ***HamCall CD-ROM from Buckmaster*** now contains International listings of amateur radio operators worldwide. A recently completed canvas of world-wide licensing sources has yielded the most current collection of listings available in this format. A number of countries are pending settlement of political boundaries or unwilling to release their data. Some countries prohibit distribution of ham data in a machine readable form.

The new CD-ROM has over 112,000 cross references from old calls to new calls. The U.S. has over 645,000 listings including clubs, military and RACES plus all classes of U.S. amateurs. Over 1,092,000 calls including international.

In addition to: call sign, name, address, license class, expiration date, birth year data, the CD-ROM has over 500 PC public domain program and data files (over 200 ZIP files). Many of these public domain items are real gems that rival the best commercial software. Both IBM PC and Apple Mac can access the ISO-9660 CD-ROM for call sign look up. This CD-ROM is a major update for Mac with U.S. and International callsign, last name, and zip access! Mac users can run any PC programs using a Software package called SoftPC. You will need to check to see which SoftPC version is right for you.

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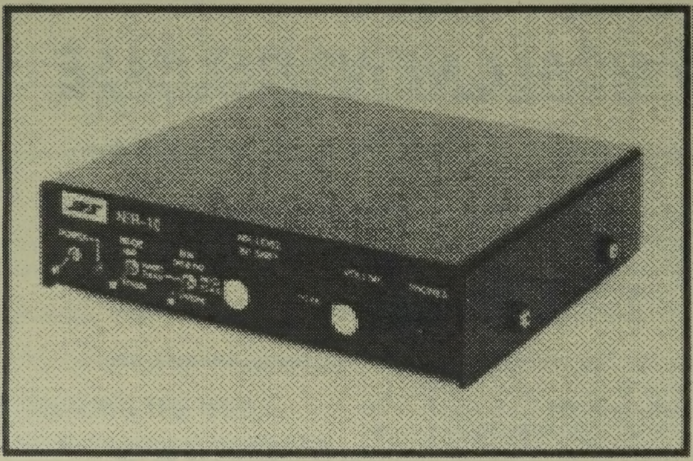

The JPS NIR-10

Digital Signal Processor

My only experience with the NIR-10, to start with, was what I had read. I didn't have a chance to use the older unit for direct comparison either. However, I had reviewed another company's signal processor giving me some good background.

Function

The function of the NIR-10 is that of an audio processor designed to improve the readability of SSB (and most other modes). The audio from the receiver is connected to the NIR-10 and processed, then sent out to an external speaker or headphones. The processing uses a Digital Signal Processor (DSP) for both filtering and noise reduction. It helps cut down on white noise, eliminate up to four unwanted CW heterodynes, bandpass settings for depths of greater than 60 dB and has a two watt internal amplifier.

What the operator wants

Ask the normal ham operator on the airwaves what they would like a black box like this to do. The main answers are to knock out an offending CW carrier while using SSB without distorting the SSB stations they are working, cut down white noise, and notch out other close SSB stations.

What the NIR-10 gives

Four basic operating modes are available by two three-position front panel switches. Combinations can also be used to set the unit for desired response output. The four modes are NIR (Noise Interference Reduction), PEAK, NF (Notch Filter) and BW (Bandpass Width). Switch one (labeled mode) can be set to NR BandPass, or Bypass. Switch two (Labeled BW) can be set to Wide/NF, Med/Peak, or Narrow.

Mode NIR is for removing noise and heterodynes that are not part of the target signal. Mode "peak" is used in reducing white noise while peaking up the target signal, especially SSB and CW. Mode NF provides cancellation of one to four tones (at the same time!) from CW, heterodynes, RTTY, or other similar signals that interfere with voice signals. Mode BW is used to enhance CW and RTTY reception operating as a digital audio filter with three selectable bandwidth ranges (250Hz, 600Hz and 1800Hz). The "mode" switch selection of "bypass" allows you to remove all processing and delay from the unit allowing for 'straight through' reception. Bypass still will use the units two watt volume control.

Getting used to DSP

Though I have heard and read of some people just hooking up the unit and starting to use it, ! think many who do this will miss out on some of the unit's capabilities. Even worse, after 10 - 15 minutes of fiddling with switches, will conclude it is not doing what was expected and trade it off.

In my opinion, a person needs two or three days of using the NIR-10 in different band conditions, combining switches, weak versus strong signals and using it in different modes such as SSB and CW, before a decision can be made. Why? Because there are so many combinations of the two switches one can use, the drive setting from your rig requires experimentation. The desired processing level has to be found (for your particular ears and radio) by experimenting with the NIR level\BP Level control. You have nine combinations alone with the two toggle switches! Of these nine, only one may give you the optimum performance desired. You may find only one you especially like for SSB local work, one for SSB DX work, and two others for CW operations. These can not be found by using the unit for 15 minutes. They take some time to discover. Once you have worked with the unit for awhile then you can quickly switch to the desired settings and processing levels for the conditions and mode desired with optimum receiver performance assured.

A chart is given with all the toggle switch settings. I found it to be a 'guide' not an absolute, however. Experimentation still initially had to be done to find the settings I wanted for each type of condition I wanted to operate. The 31 page manual also helps, but gets a bit confusing at times since more than one set of switches can be used to accomplish an end result. It is hard to write absolute settings in a manual when there is so much interaction with settings. There is no "for best noise reduction" always use setting X and Y. The NIR-10 is too versatile for that. Start with the guidelines, get used to the terminology, experiment and you will be well rewarded with audio you never thought possible from an external audio unit.

Price: $349.50

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— by Tom Torgerson, N0MOP
Worldradio Magazine

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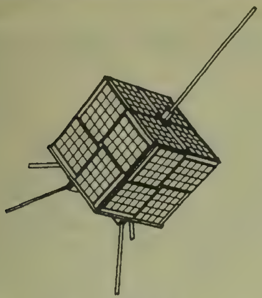

SPACECOM

Field Day 1994

Now is the time to start in depth planning for this year's Field Day. Start assembling your portable SATCOM gear and antennas now. Don't wait until the second weekend in June to start planning for a SATCOM Field Day effort. Remember, your local club will be more than happy to see you show up with your satellite comgear to give them extra QSO and bonus points with out the penalty of additional transmitters. Concentrate on the LEO EasySats (RS-10/11, 12/13 & AO-21) since these birds take far less equipment and preparation to produce successful SATCOM QSOs than OSCAR-10 & 13.

With the frustration still fresh in my mind from last year's FD operation, remember: work your SATCOM contact early in the game. Do not wait until the last pass to nail a satellite QSO. Don't forget to get on the birds regularly and practice, practice, practice making QSOs. The more at ease you are during FD, the easier it will be to make satellite contacts and boost your club's score.

Don't forget to have some information readily available for the flock of interested club members that will hover around your SATCOM station during a pass. When they see how easy you make it look to work through RS10/11, 12/13 and AO-21, more than a few of them will be bitten by the SATCOM bug. Don't miss out on any chance to provide information and guidance on how to become active on the amateur satellites.

Packet BBSs and the satellite operator

If you are serious about amateur satellite communications and do not spend any time on your local Packet Radio BBS, you are missing out on a lot of valuable information. In addition to the bi-weekly Keplerian Data that is posted on the BBS, a large quantity of information about the U.S. space program, shuttle launches and amateur satellite programs also find their way onto the boards.

One of my favorite items is SpaceNews edited by Jack Magliacane, KD2BD, in Wall Township, NJ. Jack's weekly synopsis of space oriented events makes for some great reading. SpaceNews covers topics relating to NASA, various unmanned satellite missions (the Hubble Space Telescope and the Mars Observer to name two) U.S. and Russian manned missions (the shuttle and MIR) as well as OSCAR news, AMSAT-NA news releases and major astronomical events' like the Perseid meteor shower. KD2DB welcomes input and comments and can be reached via FAX: 908/747-7107, Packet: KD2BD @ NN2Z. NJ. USA. NA.

AMSAT-NA also uses Packet BBSs to distribute their Amsat news releases via the Amsat News Service (ANS). If you want to keep up with the latest information and direction that AMSAT-NA is headed, this is must reading. ANS news releases also provide information on the current happenings (like the multiple launch of four new hamsats via an Ariane-4 launch vehicle on September 26, 1993) and progress on the Phase-3D project, which is due to replace OSCAR-13 in late 1995 or early 1996. Since P3D will be the satellite that will furnish the bulk of the long-haul amateur SATCOM into the 21st century, all active SATOPS should make every effort to stay abreast of the latest developments on this project. A few minutes once or twice a week scanning through the listings of messages on your local Packet BBS will keep you in reading material for quite a while.

New HAMSATS

Speaking of the four new amateur satellites, OSCARs 25, 26, 27 & 28 were launched from the European Space Agency (ESA) facility in Kouru, French Guiana via an Ariane-4 booster on September 26, 1993. Of the four hamsats, the Italian ITAMSAT-OSCAR 26 the Virginia-base AMRADOSCAR 27 are microsat-type digital satellites. The other two hamsats, Korea's KITSAT-OSCAR 25 and Portugal's POSAT-OSCAR 28 are Surrey Satellite Technology Limited (SSTL) designs which have on-board imaging via CCD cameras. 1993 was definitely a banner year for satellite communicators. A tip of the hat and a hearty "Well done" to the folks at ESA for lofting this latest quartet of hamsats. (Thanks ARMSAT-NA News Service.)

SATCOM bookshelf

This month I am starting a regular feature in my SPACECOM column to showcase a book or periodical that is of interest to the satellite operator. The featured book this month is the ARRL's Satellite Experimenter's Handbook by Marty Davidoff, K2UBC.

This book is the definitive source of information for the serious satellite user. The sixteen chapters and six appendices contain so much information, it will take the average SATOP a lot of reading to wade through the material. Make no mistake about it, this book is intense and packed with essential information.

The book is divided into three parts. Part one (chapters one through four) deals with the history of amateur satellites and presents a chronological history of events starting with the launch of Sputnik on October 4, 1957 and concludes with the Phase-4 geosynchronous satellites proposed by AMSAT for launch in the beginning of the 21st century. Part two details the fundamentals of satellite communications and how to assemble a SATCOM station. These six chapters form the basics of satellite communications for the radio amateur and are very informative. The last six chapters in Part three, are geared for the advanced satellite experimenter. Emphasis here is on orbital mechanics, in depth satellite tracking, radio links, weather and TV satellites, to name a few.

The appendices contain detailed information on satellites, their operational parameters, tracking data, computer programs, and much more. In short, just about everything you'll need to know to become active in amateur SATCOM is presented within the pages of The Satellite Experimenter's Handbook. Beginner and seasoned SATOP will find tons of useful information in this book. Price is $20 (excluding shipping) direct from the ARRL (225 Main St., Newington, CT 06111), R. Myers Communications (P.O. Box 17108, Fountain Hills, AZ 85269-7108) or AMSAT-NA (P.O. Box 27, Washington, D.C. 20044).

Antennas for low earth orbit satellites

One of the nice things about Low Earth Orbit (LEO) satellite communications is station simplicity. LEO SATCOM, unlike the high orbit satellites, is not hardware intensive. If you have a 2 meter omnidirectional antenna and a dipole antenna that will resonate on 10 meters, you have the basic antenna farm needed to enjoy many hours of fun on the LEO Mode-A (2 meters uplink, 10 meters downlink). Mode-K (15 meters uplink, 10 meters downlink) will require two HF antennas.

At K7YHA, I have used several different types of uplink and downlink antennas for Modes A and K. Originally I started with a 2 element HF beam for 10 meter downlink and a 2 meter J-pole for Mode-A uplink. Mode-K uplink was accomplished using a Radio Works Carolina Windom-II at 25 feet. This configuration worked well for many months.

(cont'd on page 12)

(cont'd from page 11)

After digging around in my basement I unearthed a CB vertical antenna that I had used in England for 10 'meter FM. This replaced the HF beam for the 10 meter downlink. Initial installation of this antenna was on my second story flat roof (about 30 feet above ground). It worked very well in this location. However, after erecting a set of K1FO long-boom yagis for V/ UHF terrestrial work, it became quite evident that the 10 meter downlink vertical antenna would have to be moved as it interfered with the rotation of the V/UHF antennas!

The 10 meter downlink antenna was reinstalled on a 10 ft piece of pipe attached to my chain link fence. It now sits much lower and closer to the aluminum siding on my three story house. Performance was reduced accordingly. While it still serves me well, it does not perform the same way it did when mounted in the clear at 25 feet. There are several "dead" spots in the antenna pattern that are very noticeable on near-over-head passes.

For a short while, I erected a 10 meter dipole at 20 ft, oriented almost due north/south. This antenna was a marginal performer at best since it was situated between two aluminum sided houses and did not have a clear view of the horizon. Unfortunately, I was unable to try different orientation on this antenna due to the limits of property and the sense of humor (or lack of it) of my next door neighbor. Having used dipoles for SATCOM work before, I am convinced that had I been able to properly erect this 10 meter dipole in the clear, it would have solved my "dead" spot problem on the Mode-A downlink.

Some might question my reliance upon a vertical antenna with its inherent low angle of radiation for use as a SATCOM antenna. Since most vertical antennas have a major radiation lobe between 7 and 20 degrees above the horizontal, initial thinking would dictate that this antenna would be great for passes that are near the horizon, but perform poorly on passes that appear overhead. Yes and no. A properly installed vertical antenna (this can be either a modified CB antenna or a multi-band vertical like the Hustler 5BTV or Butternutt HF-6V) will have a low angle of radiation. This is why they work so well on DX. As the satellite breaks the local horizon and Acquisition of Signal (AOS) is encountered, downlink signal strengths should remain fairly constant. On passes where the satellite never exceeds 25 to 30 degrees altitude consistent downlink signals should be the order of the day.

The "holes" in antenna coverage pattern are compensated somewhat by the decreasing distance between the satellite and the downlink antenna, as the satellite approaches overhead. The increased downlink signal strength will, in most cases, cancel out the nulls in the antenna pattern. Hence, using a low cost CB vertical antenna (converted to 10 meters) as a Mode-A and K downlink antenna is not such a bad idea after all.

Mode-A uplink (2 meters) follows the same logic. While you can spend the time building a turnstile or "egg beater" antenna for the uplink skyhook, a simple J-pole or quarter wave vertical with radials will work very well. The main advantage of the turnstile or "eggbeater" antenna is the hemispherical radiation pattern that virtually eliminates all overhead nulls in the antenna pattern. This should provide highly reliable signals (either up or downlink) irrespective of the altitude and/or distance of the satellite with respect to your SATCOM ground station.

In reality, building or (shudder) buying one of these antennas just to eliminate a couple of nulls in your 2 meter antenna system is a questionable exercise. In my particular case, I have found that a homebrew 2 meter J-pole works great for terrestrial contacts as well as Mode-A uplink. Listening to the 2 meter downlink signal on AO-21 leads me to believe that my J-pole provides very good coverage, despite a theoretical low angle radiation pattern. This antenna is mounted high on the end of my 3 story house and has a very good look at the horizon in all directions.

Very shortly, I will be erecting a set of V/UHF quarter wave antennas for LEO Mode-B (AO-21) and Mode-A uplink. This set of antennas is designed to replace my dual-band J-pole built from an AMSAT-NA design by Dick Jansson, WD4FAB. Unfortunately this dual-band J-pole never played very well. The 2 meter portion worked fine, but the 70 cm portion could never be properly adjusted and constantly suffered from high VSWR.

—by Rich Arland, K7YHA from his SATCOM column, Worldradio Magazine

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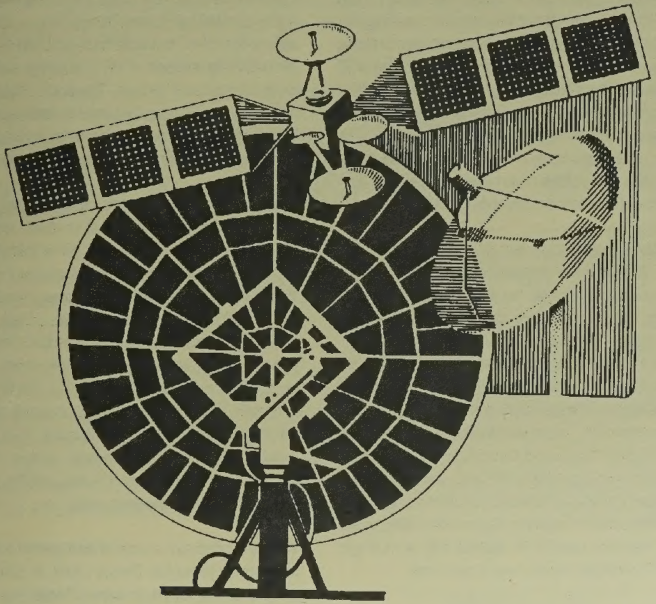

GIANT COMMERCIAL SATELLITE NETWORK PLANNED

Amateur operator developed packet network in the sky!

GIANT COMMERCIAL SATELLITE NETWORK PLANNED Amateur operator developed packet network in the sky!

Microsoft's Bill Gates and McCaw Cellular's Craig McCaw, two of the nation's wealthiest individuals, are the principal investors in a $9 billion project to orbit hundreds of satellites for high-bandwidth communications. Each will own more than 30% of the project. Separately, Microsoft has invested in a terrestrial radio -E-mail network for portable communications devices.

The satellite system was invented by an obscure company known as Calling Communications which announced it last year. It received virtually no attention from the worldwide press until the business was acquired by Gates and McCaw and renamed Teledesic Corp. The company filed its formal (175-page) application on March 21 after re-announcing it to the world, this time generating a flurry of news stories.

The founder of the Teledesic concept and Vice Chairman of the company is Edward F. Tuck of West Covina, Calif. Ed is also a General Class ham with the station call sign: WD6CRP. Headquartered in Kirkland, Washington, Teledesic submitted its proposal as part of the FCC's examination of LEO (low-earth orbit) satellite systems in the 28-GHz band. Craig McCaw has now assumed the duties as chairman of Teledesic.

With its application, Teledesic submitted the FCC's required filing fee - a mere $216,000! (The application was in great demand when we arrived at the FCC early the next morning to look at it. Several copies had already been stolen!)

The system can only be described as MASSIVE! Teledesic proposes to place into low-Earth orbit a ring of 964 satellites - 880 active "birds" plus 64 spares. This is said to be about three times the number of all satellites in the world today. The peculiar-looking satellites resemble upside-down flowers of eight petals. Each jointed petal consists of three panels; each panel is a complete transceiver with phased-array antenna.

The company described its service as a "Global Internet," offering voice channels, broadband channels supporting video conferencing and interactive multimedia, and real-time two-way data services. Supported data speeds range from 16 kbps to 1.244 Gbps for "special applications".

If devoted to narrowband voice channels exclusively, the system could support 20 million users. It will in fact be used for a smaller number of channels of higher average bandwidth. Video could be transmitted at "VCR quality." All communication is treated identically within the network as streams of 512-bit packets. Each satellite is a node in this packet network, with links to eight adjacent satellites.

Unlike Iridium, Motorola's proposed $3.4 billion 2 GHz system of 66 satellites (or its several competitors), Teledesic is supposed to be for fixed, not mobile, use. However, we expect this distinction to prove largely artificial once the system is in operation.

In addition to commercial network applications, the company sees many educational benefits. "The interactive wireless broadband capability of the Teledesic Network holds the promise of delivering distance learning services to the most remote parts of the United States and the world," the company said.

"Students in even the smallest school districts can use advanced information technology for such purposes as to access NASA, to leave messages for astronauts, to browse around libraries larger than they will ever be able to visit, to interact with explorers in Antarctica, and to discuss world ecology with students in countries around the world."

The company expects to begin launching satellites in the year 2000, with regular service beginning in 2001. Teledesic Bands

Uplinks	28.6-29.0 and 27.6-28.4 GHz
Downlinks	18.8-19.2 and 17.8-18.6 GHz
Intersatellite Links	59.5-60.5 and 62.5-63.5 GHz

The complex satellite network will rely primarily on technology (code-named "brilliant pebbles") developed under the government's Strategic Defense Initiative ...the so-called "Star Wars" program. Basically, network communications travel from satellite-to-satellite and are eventually downlinked to land-based deStinations for distribution by existing terrestrial telecommunications carriers.

—W5YI Report 4/15/94

Virtual Reality

by Wayne Renardson, NZ4W

Virtual Reality (VR) is on the lips of nearly everyone. There are arcade games available where customers don headgear, gloves, and suits to travel in a virtual (almost real) world where they can pretend to command a jet fighter or slay a thousand demons. Then there is Virtual Vera, who may be the first sexual playmate for VR. Some software mavens are making some rather ridiculous claims about their programs being VR, and the flood of hype is going to increase as VR plays a larger role in digital communications.

A recent article by Steve Elliot (Midnight Engineering, Vol. 4, No. 6, December '93) discusses some of the conclusions about VR resulting from the Rocky Mountain Virtual Reality Conference. The conferees discovered that everyone knew the wrong things about VR, with misconceptions everywhere. The top four were: (1) It is a movie, like Lawnmower Man and Wild Palms; (2) It is just a video arcade game; (3) It is too expensive for commercial applications; and (4) It has nothing to do with me. Elliot believes that while games are an excellent way to introduce the public to the medium, VR has broad-based uses in architecture, medicine, manufacturing, and scientific modeling. At the present time it requires about $30,000 to put an off-the-rack VR setup together, but prices will drop another $10,000 within a year. The point to grasp is that with VR there is a paradigm shift in thinking; VR is a new computer interface, not a piece of hardware, software, or add-on to your present system.

Interfaces as we know them require the user to adapt to the machine's mode of operation. We must speak its language. With VR, the promise of having the computer communicate with humans in their native language, using speech, gestures, and kinetics, will become the method of choice. VR will combine speech and gesture recognition, heuristics (providing direction toward problem solving), neural linguistic programming, and audio and visual feedback mechanisms to develop a completely new way of computing. As an example of a problem that could be overcome by VR, he cites the inherent difficulty of an architect using a two-dimensional mouse to manipulate a three-dimensional CAD program and how it would benefit everyone if the architect could go into the 3D design and manipulate the structure of the building.

VR's use in education is clear. Using a fire department training session as an example, Elliot asks if it would be more meaningful to read about the dangers of paint fumes or to be inside a VR garage when it caught afire. The user could gauge reaction (did you panic and run or grab an extinguisher?), review their behavior, and gain more knowledge, all without the expense or time involved to rebuild the garage or heal the burns that might occur in a real mock-up.

In the same issue, Charles Ostman discusses VR and the PC. He informs us that VR must use a real-time rendering system as opposed to our present static rendering system. Information in a virtual or theoretical region of 3D space is updated on a frame-by-frame basis either 15 or 30 frames/second. Users need a method for viewing this created environment as a 3D visual experience. The other requirement is a physical input interface that can be as simple as a joystick or as complicated as a full body suit that allows the user to move in virtual space.

NASA has been a large user and developer of the concept. Academic and corporate entities have numerous uses for VR technology, but it is only recently that the subject has moved outside these limited circles due to the required power to run VR. Ostman reports seeing a representation of a pterodactyl ride at a recent west coast SigGraph show. The user could sit on a life-size tactile model of the pterodactyl and literally "fly" through a Jurassic canyon. The engine required to drive the model consisted of three Silicon Graphics Reality super computers running in parallel at full speed, items not likely to be found in many ham shacks. But Ostman believes VR is coming to the PC platform. Commodore's Amiga computer has been used for VR, but they may be moving to the PC since their market share is quite small.

One of the early uses of VR involved music. Trying to play guitar chords without an actual instrument, Thomas Zimmerman figured a way to make his computer interact with a wired glove by having his PC play musical notes as he moved his fingers on an imaginary fretboard. Working with his friend, musician and programmer Jaron Lanier, they were interested in the possibility of having the computer controlled by natural gestures. Together they started VPL Research to make gloves and other VR equipment. Lanier is credited with coining the term "virtual reality" in 1989, according to Tom Hayward, author of Adventures in Virtual Reality, a recent book from QUE publications. The book comes complete with floppy disc containing programs and viewing glasses that resemble the specs worn in the original 3D movies. If you are ancient enough to recall, they had cardboard frames with plastic lenses colored blue and red, and the wearer looked like a geek with some bizarre optical disease.

Hayward's book is divided into chapters that first take the reader through the basic concepts and how they function on a computer. Chapter two covers the history of VR, featuring some of the people who made contributions, while Chapter 3 discusses the current state of VR. The following chapter reviews present and possible ways VR can be put to practical use. The next chapter explores problems and solutions offered by VR. Chapter 6 explores the physics involved in writing for the VR environment in a friendly manner, and the final chapter includes instructions and commentary about the programs included with the disc.

Part of learning any new concept is dealing with a new lexicon, and VR has its own. The descriptions and explanations offered in Hayward's book deal with explaining the underlying concepts of VR in language suitable for most non-technical readers. The book serves as an introduction to VR, not as a manual for techno-junkies or programmers. An appendix cites many additional texts for anyone who wants to extend their knowledge.

Terms such as clone picture, viewpoint, navigation, manipulation, and immersion are all clearly explained. HMDs (head-mounted display), WOW (Window On World), the Convolvotron (chips that process the sound signals costing $15,00 today), information about sound and acoustics, and kinesthetics (sense of touch) are all discussed in clear language. Image feedback, interacting with size, weight, and shape, and proprioception (receiving signals from inside the body) are included, along with Photo-VR, 3D applications in sports, shopping, and education. Included are tools for handicapped, all adequately explained by Hayward, with a large number of pages devoted to the human optical system and the camera and computer's way of viewing reality.

VR has reached such a stage of development that it now has its own philosopher. Brenda Laurel, an actress with a PhD in drama, is trying to create a "virtual environment for two" by taking audio and video recordings of a mountaintop cave in Banff, Alberta, and putting them into a computer so people can enjoy the scenic beauty of the Canadian Rockies without leaving their home. Laurel works out of the Interval Research Laboratory, a computer research facility in Palo Alto, CA. She describes herself variously as a "research artist" and a "nerd hag," which evidently means she prefers the company of nerds, or "people who are very industrious, very smart, raised by wolves." She has published academic essays relating computers to Aristotle's Poetics, and she recently appeared on the cover of Mondo 2000, a cyberpunk magazine, dressed as an extraterrestrial vamp.

Laurel, who is 42, grew up in Indianapolis and studied drama at Ohio State. She worked part-time at a friend's computer company and then made the trek to Silicon Valley to produce video games and software for Atari. She has written a collection of essays called The Art of Human-Computer Interface Design and published a new edition of her book, Computer As Theatre, including a chapter called Post-Virtual Reality; After the Hype is Over. Laurel is not happy with the popular conception of VR so she would like to rename it, preferring "telepresence," "augmented reality," or "immersion technology"—anything that doesn't promise a truly realistic experience, which is way beyond today's computing power.

When asked why she is working in the mountains on the experiment, Laurel replies, "Because we can't all live here. Because it's a way to help us see what's around us all the time, again, anew. It's a classic function of art. I can bring people to this mountaintop cave, but it's my opportunity as an artist to reveal this place with a point of view, and hopefully people will see the real world differently after having this experience. Either that or they'll throw up from motion sickness."

She envisions her visitors donning helmets with interior monitors and headphones, finding themselves in a computerized world of the cave whose walls will be adorned with crows, snakes, and a petroglyph. If you stare at one of the crows long enough it will "sort of detach from the wall and come up to you and say something like: `I am Crow. I am the eye of the world.' Then, if you move forward and put your head inside him, you'll put him on and become Crow."

Unlike current VR applications that feature mass killings, bombing of people and buildings, frantic car chases and assorted virtual mayhem, Laurel's world will be free of dangers. As an artist, she prefers the world of aesthetics to the status quo, and plans to incorporate her vision into her software.

"I learned in the computer game business early on that all senses are not equal," she claimed. "The best example is if you're driving down the road listening to a radio you might suddenly realize you haven't seen the road in five minutes. That's because your visual cortex has been partying with your audial imagination. But when you turn the television's sound off, you don't get an imaginary video interview. In the gaming business we discovered that high-quality audio will actually make people think the games have better video. But a really good picture will not make audio sound better."

Laurel believes VR will be available and in living rooms within a few years. Like a dedicated DXer, she imagines people linking up with others in a common virtual world for walks and conversation. Together they might visit the Grand Canyon, or the Canadian Rockies. She does not speculate about what else they might do there, but she does remain philosophical."The whole course of our development — of words and writing and stories and art and theatre — has been a march toward finding better ways to share the contents of our imaginations with each other," she says. "In the VR field, there's kind of a naive belief that once we're able to do that better — what Timothy Leary calls `screen each other's minds'—we'll suddenly get a whole lot better at understanding each other."

For an introduction to some of the concepts behind VR, Adventures in Virtual Reality by Tom Hayward is a recommended point of departure. Available from QUE Books, a division of Prentice-Hall, 113 Sylvan Avenue, Inglewood Cliffs, NJ 07632. Additional resources for the inquisitive are the author and Andy Hayward of Andrew's Vee-AR Club and newsletter, 624 Jackson St., Stoughton, WI 53589, Paul Matthews @ the Boston Computer Society VR Group c/o Building 1400, One Kendall Square, Cambridge, MA 02139 (508) 921-6846, the CompuServe VR Forum, GO GRAPHDEV (on-line), the Diaspar VR Network BBS run by David Mitchell @ 424 Glenneyre, Laguna Beach, CA 92651 9600 baud (714) 376-1234 or 2400 baud (714) 376-1200. Via the InterNet there is a UseNet group Sci.virtual-worlds and there is a VR information line available with news, updates, and events reached by calling 1-900-VIRTUAL (847-8825) at $1.25/minute. There is also a forum on The Well BBS, the Whole Earth 'Lectronic Link @ 27 Gate 5 Road, Sausalito, CA 94965-9976 (415) 332-4335 (voice) (415) 322-6106 (modem). See you in the next world.

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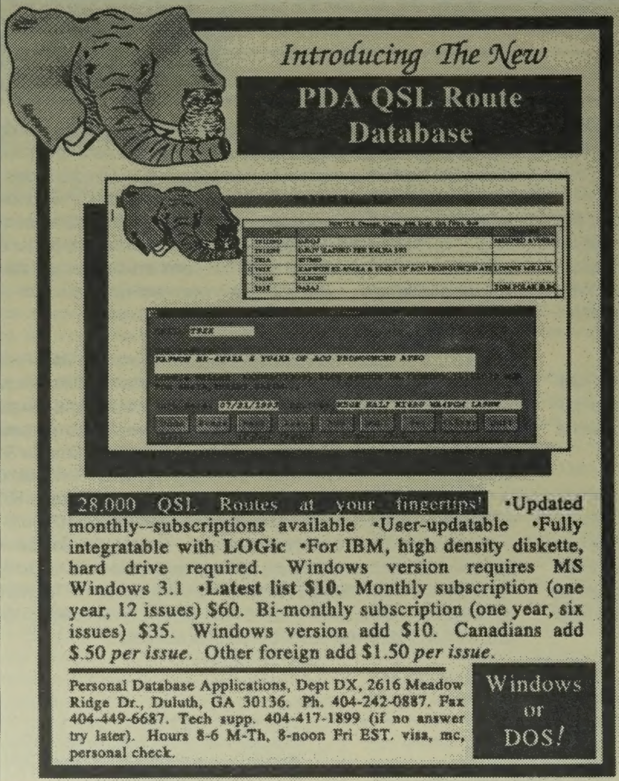

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(cont'd from page 3)

Amateurs were afraid they would have to shut down their high speed packet radio messaging system because of their inability to individually review every message flowing through their "digipeating" stations.

To address the dilemma, the FCC proposed in March 1993 to add a new rule 97.217 which would hold both the message originator and the operator of the first forwarding station retransmitting a packet message accountable for message content. Current Part 97 rules do not distinguish between amateur stations that originate and forward packet messages.

Our deadlines are one week earlier this month due to our attendance at the Dayton HamVention, so we are unable to report exactly how the FCC ruled. We will cover the Report and Order in detail in our next issue.

☛ **Record numbers** (more than 70 thousand) attended the 1994 convention of the National Association of Broadcasters held last month at the Las Vegas Convention Center. "Reinventing Broadcasting" was the theme as broadcasters seek a location on tomorrow's Information Superhighway. "Multimedia" was a key word!

They heard FCC Field Operations Bureau Chief Richard Smith say that their weekly on-air Emergency Broadcast System tests will be replaced with' a silent test. The new EBS rules will also include new cable-TV emergency alerting criteria.

The FCC's proposal to award TV stations a second channel for HDTV (high definition television) broadcasting, digital compression, flexible spectrum use and interactive television via special IVDS (218-219 Mhz Interactive Video and Data Service) return paths were also popular subjects.

—W5YI Report 4/15/94

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